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AMENDMENT IN THE CLAIMS:

Please amend the claims as follows:

1. (previously canceled)
2. (previously canceled)
3. (previously canceled)
4. (previously canceled)
5. (previously canceled)
6. (previously canceled)
7. (previously canceled)
8. (previously canceled)
9. (previously canceled)
10. (previously canceled)
11. (previously canceled)
12. (previously canceled)
13. (previously canceled)
14. (previously canceled)
15. (previously canceled)
16. (previously presented) An ultrafine crystal layer forming process of forming an ultrafine crystal layer in a workpiece constituted by a metallic material, said process comprising:  
performing a machining operation on a surface of the workpiece using a machining tool, so as to impart a large local strain to the machined surface of the workpiece,  
wherein said machining operation using said machining tool causes the machined surface of the workpiece to be subjected to a

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plastic working that causes the machined surface of the workpiece to have said large local strain in the form of a true strain of at least 1, such that said ultrafine crystal layer is formed in a surface layer portion of the workpiece that defines the machined surface of the workpiece.

17. (previously presented) The ultrafine crystal layer forming process according to claim 16, wherein said machining operation using said machining tool is performed on the surface of the workpiece that is constituted by a steel material as the metallic material, with a material temperature at the machined surface of the workpiece being held lower than an Acl transformation point of the steel material.

18. (previously presented) The ultrafine crystal layer forming process according to claim 16, wherein said machining operation using said machining tool is performed on the surface of the workpiece that is constituted by a non-steel material as the metallic material, with a material temperature at the machined surface of the workpiece being held lower than substantially half a melting point of the non-steel material, where said material temperature and said melting point are expressed in terms of absolute temperature.

19. (previously presented) The ultrafine crystal layer forming process according to claim 16, wherein said machining operation using said machining tool is performed on the surface of the workpiece that is constituted by a steel material as the

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metallic material, with a material temperature at the machined surface of the workpiece being held in a range which is not lower than an Acl transformation point of the steel material and which is lower than a melting point of the steel material.

20. (previously presented) The ultrafine crystal layer forming process according to claim 16, wherein said machining operation using said machining tool is performed on the surface of the workpiece that is constituted by a non-steel material as the metallic material, with a material temperature at the machined surface of the workpiece being held in a range which is not lower than substantially half a melting point of the non-steel material and is lower than the melting point of the non-steel material, where said material temperature and said melting point are expressed in terms of absolute temperature.

21. (previously presented) The ultrafine crystal layer forming process according to claim 19, further comprising:

cooling the machined surface of the workpiece, after the machining operation using the machining tool has been performed,

wherein the machined surface of the workpiece is cooled at a rate higher than a cooling rate that is required for hardening the workpiece.

22. (previously presented) The ultrafine crystal layer forming process according to claim 19, wherein the machining operation using the machining tool is performed such that a material temperature at a non-ultrafine crystal layer is held at

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least about 500 C° for a length of time that is not larger than about 1 second, for providing the non-ultrafine crystal layer with a hardness that is about 80 % as high as a hardness of a substrate of the workpiece,

and wherein the non-ultrafine crystal layer is provided by at least one of (i) a lower layer portion that is located on an inner side of the surface layer portion as a machined surface layer portion and (ii) another surface layer portion that is located in neighborhood of the machined surface layer portion.

23. (previously presented) The ultrafine crystal layer forming process according to claim 20, wherein the machining operation using the machining tool is performed such that a material temperature at a non-ultrafine crystal layer is held at least about 500 C° for a length of time that is not larger than about 1 second, for providing the non-ultrafine crystal layer with a hardness that is about 80 % as high as a hardness of a substrate of the workpiece,

and wherein the non-ultrafine crystal layer is provided by at least one of (i) a lower layer portion that is located on an inner side of the surface layer portion as a machined surface layer portion and (ii) another surface layer portion that is located in neighborhood of the machined surface layer portion.

24. (canceled)

25. (canceled)

26. (canceled)

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27. (canceled)

28. (canceled)

29. (canceled)

30. (canceled)

31. (canceled)

32. (canceled)

33. (canceled)

34. (canceled)

35. (canceled)

36. (canceled)

37. (canceled)

38. (previously presented) The ultrafine crystal layer forming process according to claim 16, wherein said machining operation is performed by moving one of the machining tool and the workpiece relative to the other of the machining tool and the workpiece in a direction that causes the surface of the workpiece to be machined by the machining tool, while one of the machining tool and the workpiece is being rotated.

39. (canceled)